

# To Recognize Face Images with Age and Weight Variations

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**Abstract**—Today face recognition plays very important role in our day today life. And from several years it has been studying by various researchers which have focused on the pose illumination, expression plastic surgery. Face recognition is very important because of the security purpose .With so many applications whether it may be small application or big application security is the major issue. Everyone wants their property to be secure so face recognition is the one which is used for security purpose. As it is very easy to recognize the face images of the famous personalities such as stars in various fields such as films, sports, politics, social workers etc. as the title suggest recognizing face images with age and weight parameter, here images are passed and need to check whether the image passed is present in FG-net database which is being used here. However the performance of face recognition with age as parameter has been found but with weight incorporated in is used to give better efficiency. The comparison between existing and proposed algorithm on database shows that proposed algorithm performs significantly.

**Keywords** — Face recognition , biometrics, facial aging

## 1. INTRODUCTION

With growing numbers of face recognition applications in every day to day life has made face recognition very important research topic now a days. Face recognition has received significant attention in the past several years because of its usage in wide variety of applications such as identification and intrusion detection. In recent years face recognition has received substantial attention from both research communities and the market, but still remained very challenging in real applications. A lot of face recognition algorithms, along with their modifications, have been developed during the past decades. A number of typical algorithms are presented, being categorized into appearance based and model-based schemes. For appearance-based methods, three linear subspace analysis schemes are presented, and several non-linear manifold analysis approaches for face recognition are briefly described. The model-based approaches are introduced, including Elastic Bunch Graph matching, Active Appearance Model and 3D Morph able Model methods. A number of face databases available in the public domain and several published performance evaluation results are digested. Future research directions based on the current recognition results are pointed out. So many Algorithms were proposed for image retrieval or identification or for matching images etc. Some of the

algorithms have focused on pose, illumination, expression so some on haar classifier of face detection. But among all the face detection facial aging is the most fascinating and challenging ones .As we are human beings there are lots of factors which brings lots of changes on us .In our facial expressions our body structure etc . This is the natural process and is affected by several factors in our day to day life or we can say in our environment or our life style. And we cannot say that there is direct relationship between the two i.e. age and weight .Sometimes with few years of gap weight increases drastically and sometimes it's totally opposite as so many year gap there is few changes in face .so improving performance of face recognition with age and weight is being incorporated.

## 2. PROPOSED WORK

### A. Problem definition

As earlier, face recognition has been used in much application but with only the age factors but as body fat increases then it would be the real challenge to recognize so in this we identified that with the weight to recognize the face images.

Proposed system uses age and weight variations and FERET database for face recognition using 4 main techniques, namely

#### 1. Viola Jones

This algorithms basic principal is to detect the faces from the given input image. Before this there were so many images processing approach but all of them were time consuming due to making the entire image to the fix size and then run the image in the detector.

Opposite of this is the viola Jones algorithm were the detector is rescale and whatever the size of image would be.

#### 2. KNN classifier

The purpose of the k Nearest Neighbors (kNN) algorithm is to use a database in which the data points are separated into several separate classes to predict the classification of a new sample point.

The way in which the algorithm decides which of the points from the training set are similar enough to be considered when choosing the class to predict for a new observation is to pick the k closest data points to the new

observation, and to take the most common class among these. This is why it is called the k Nearest Neighbors algorithm.

### 3. Local Binary Patterns (LBP)

LBP is one of the binary patterns which is used for the feature extraction. In this the face image is firstly divided into small regions from which LBP features are extracted gives the output in histogram. LBP is used because there are micro patterns which are invariant of monotonic grey scale transformation. Combining all this gives the face image .LBP is widely used in many application due to its high tolerance against object recognition texture analysis and high discriminative power. The fig 1. Shows the flowchart of LBP.

### 4. Support Vector Machines (SVM)

In support vector machine is used to analyze the complex data and gives the result. SVM is very useful in finding patterns which are very useful and not complex.

## 3. TOOLS USED

### A. Matlab

As the project work is related to face recognition which falls under the domain of image processing, here MATLAB is used for the it's well adapted to numerical experiments property. It also helped to show the results in graphical output. It handles vector and matrices very nice. Quick plotting and analyze extensive documentation, along with so many built in functions.

### B. FG-Net database

In automatic facial age estimation the aim is to use dedicated algorithms that enable the estimation of a person's age based on features derived from his/her face image. The facial age estimation problem shares several similarities with other typical face image interpretation tasks where the execution stage includes the process of face detection, location of facial characteristics, feature vector formulation and classification.



Figure 1. Example of aging effects.

## 4. PROJECT DESIGN/MODULES

These are the two important modules where the entire task has been performed.

### a. Training set (DB Creation)

In training set mainly input is being given and then with the help of the viola Jones algorithm with cascade object detection detects the image and facial geometry does the face extraction which includes of eyes, nose, mouth and face and with local binary patterns feature extraction is done so the name, age object is saved. All is done in database creation of training set.

### b. Testing set (DB Evaluation)

In testing set mainly all the above steps are followed with SVM (support vector machine) which evaluates the matching of the image in testing set to the training set.

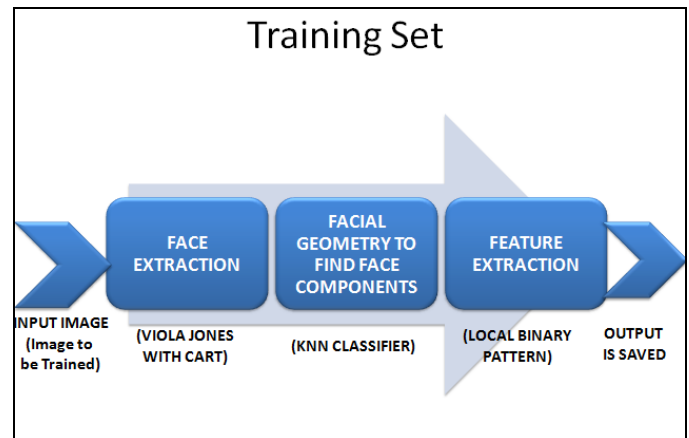


Figure 2. Training set.

The main focuses is on how the image of testing set matches with the image of the training set with complete information of age and weight .

### DBcreation

1. Take an input of image.
2. Now face extraction algorithm will work i.e. viola Jones algorithm with cascade object detection.
3. With the help of facial geometry face components can be extracted such as eyes, mouth, nose, complete face.
4. Local binary pattern method which is most successful for face recognition is used for feature extraction.
5. Now our object is saved with the name and age.
6. Again repeat the same procedure until all the images of DBcreation is not used as input.

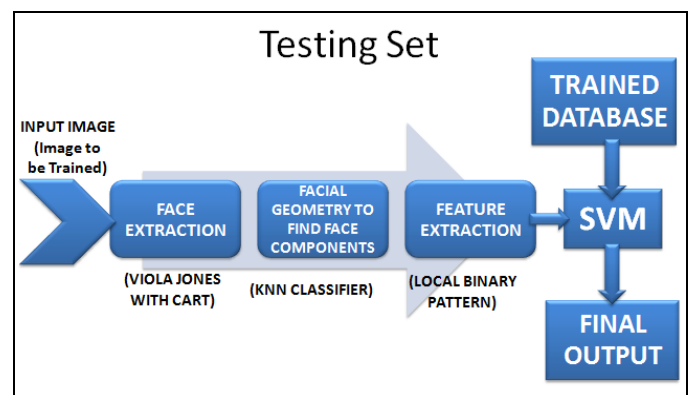


Figure 3. Testing set

### DB evaluation

1. Take an input of image.
2. Now face extraction algorithm will work i.e. viola Jones algorithm with cascade object detection.
3. With the help of facial geometry face components can be extracted such as eyes, mouth, nose, complete face.
4. Local binary pattern method which is most successful for face recognition is used for feature extraction
5. Now SVM (support vector machine) will find out whether the feature extraction of an image in testing set is matching to the feature extracted from the training set

## 5. RESULTS

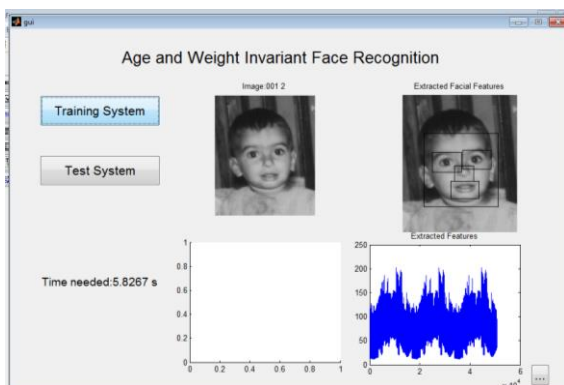


Figure 4. Figure of training process.

The above shown screenshot is from the training set where the image is given as input where feature is being extracted such as eyes, nose, mouth, and ear.

The first block is the image taken from the training set and the second image is the image is extracted i.e. we can say which is eyes mouth nose ear face.

The 4<sup>th</sup> block is the block of histogram where the LBP is used for feature extraction.

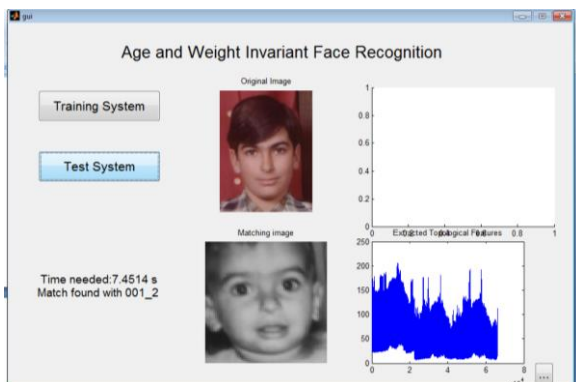


Figure 5. Testing process

Here the image is taken from the testing set where we have taken image as and now SVM works behind and gives the

matching image from the training set. This is the way the output is shown. And the 4<sup>th</sup> block is the block of histogram.

The above outputs can be explained as

Table 1. Training set

image	Expected name	Obtained name
01	001	001
02	001	001
03	001	001
04	001	001
05	001	001
06	001	001
07	001	001
08	001	001
09	001	001
10	001	001
11	002	002
12	002	002
13	002	002
14	002	002
15	002	002
16	002	002
17	002	002
18	002	002
19	002	002
21	002	002
22	002	002
23	003	003
24	003	003
25	003	003
26	003	003
27	003	003
28	003	003
29	003	003
30	003	003
31	003	003
32	003	003

Table 2. Testing set

image	Expected name	Obtained name
33	001	001
34	001	001
35	001	002
36	001	002
37	002	002
38	002	002
39	002	002
40	002	001
41	003	001
42	003	003
43	003	001

As we have shown two tables that contain images which are already stored in the training set and testing set and we have evaluated the images one by one and we got output as all the images which we have stored in the training set is found perfectly matched invariant of age and weight of face recognition because we have already trained the image. But the images of the testing set when evaluated some do not matched as expected. But we can find the accuracy of this

output. As previously the accuracy of matching lies only 20-30 % but as we have used the standard database i.e. FG-net database so we got the accuracy about 80-90 % as shown in the table.

As in the table and output

001 indicates person number. A is age separator. 02 are age mentioned of that person. Various people have different ages.

Accuracy = total no of matched images/total no of images (training + testing)

Accuracy = 38/43  
= 88.37%

## 6. COMPARISON

The accuracy in the previous system was very low i.e. 10-15% and weight was not incorporated and in the proposed system the accuracy has being increased from the 80-90% and the weight is been incorporated and the results are been shown on the fg-net database.

## 7. CONCLUSION AND FUTURE SCOPE.

As the challenge of this paper was to incorporate weight for addressing the face recognition with age parameters as there can be big difference with more age gap and relatively small difference with respect to few age gap which solely depends upon the various conditions such as living style, medical conditions etc. we proposed the system where weight has been incorporated to verify or identify the face images. The results are already available on fg-net database. The result which shows the weight incorporating information improves the performance.

The future scope of this is to improve the database of public where the large public database is available. And to improve more efficiency.

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